CLAIMS:

1. A contactless detection cell (15, 23) for detecting an electrical property of one or more sample compounds in a flow path, said contactless detection cell (15, 23) comprising:

a transmitter electrode (16, 24) adapted for capacitively coupling an AC current into a detection channel of the flow path;

a receiver electrode (17, 25) adapted for receiving the AC current that has been coupled into the detection channel;

wherein an inner cross-section in at least a section of the detection channel is different than an inner cross-section of the flow path towards the detection channel.

2. The detection cell of claim 1, wherein the inner cross-section of the detection channel is narrowed between the electrodes in a way that the resistance of the sample volume between the transmitter electrode and the receiver electrode is increased.

3. The detection cell of claim 1 or any one of the above claims, wherein the transmitter electrode and the receiver electrode are axially separated from each other in the flow path.

4. The detection cell of claim 1 or any one of the above claims, wherein the axial separation between the electrodes is sufficiently large for avoiding or at least reducing cross-coupling between the transmitter electrode and the receiver electrode.

5. The detection cell of claim 1 or any one of the above claims, wherein within the entire detection channel, the inner cross section of the detection channel is kept small.

6. The detection cell of claim 1 or any one of the above claims, wherein, at the respective sites (27, 28) of the detection channel where the transmitter electrode (24) and the receiver electrode (25) are located, the detection channel's inner cross-section is larger than the detection channel's inner cross-section in the portion between the electrodes.

7. The detection cell of claim 1 or any one of the above claims, wherein the geometry of the detection channel is axially varied in a way that an hour-glass shaped geometry of the detection channel is obtained.

8. The detection cell of claim 1 or any one of the above claims, wherein the detection channel is implemented by means of a capillary with a reduced inner cross-section in the portion between the transmitter electrode and the receiver electrode.

9. The detection cell of claim 7 or any one of the above claims, wherein in the portion of the detection channel between the electrodes, the inner diameter of the capillary is equal to about 0.1 µm to 200 µm, preferably 1.0 µm to 20 µm.

10. The detection cell of claim 7 or any one of the above claims, wherein in the portion of the detection channel between the electrodes, the ratio of the capillary's outer diameter to the capillary's inner diameter is equal to about 1.1 to 50, preferably 1.5 to 10.

11. The detection cell of claim 1 or any one of the above claims, wherein the detection channel shape is implemented using microstructuring technologies as common for making microfluidic chip devices.

12. The detection cell of claim 1 or any one of the above claims, wherein the detection channel is implemented as a part of a microfluidic chip device.

13. The detection cell of claim 1 or any one of the above claims, wherein the

electrical property is at least one of: conductivity, complex conductivity, impedance, resistance, reactance, relative permittivity.

14. The detection cell of claim 1 or any one of the above claims, wherein the detection cell is adapted for detecting conductivity of the sample compounds.

15. The detection cell of claim 1 or any one of the above claims, wherein the one or more sample compounds have been separated in a preceding separation flow path.

16. The detection cell of claim 1 or any one of the above claims, wherein the inner cross-section of the detection channel is smaller than the inner cross-section of the flow path towards the detection channel.

17. The detection cell of claim 1 or any one of the above claims, wherein the inner cross-section of the detection channel is greater than the inner cross-section of the flow path towards the detection channel.

18. A contactless conductivity detection cell for detecting conductivity of sample compounds that have been separated in a preceding separation flow path, said contactless conductivity detection cell comprising

a transmitter electrode adapted for capacitively coupling an AC current into a detection channel;

a receiver electrode adapted for receiving the AC current that has been coupled into the detection channel, with the transmitter electrode and the receiver electrode being axially separated;

a detection channel, wherein the inner cross-section of the detection channel between the transmitter electrode and the receiver electrode is smaller than the inner cross-section of the separation flow path.

19. A separation system comprising

a separation flow path (14, 22) adapted for separating sample compounds of a given sample;

a contactless detection cell (15, 23) according to any of claims 1 to 17.

20. The separation system of claim 19, wherein the separation system is at least one of: an electrophoresis system, a liquid chromatography system, an electrochromatography system, or a combination thereof.

21. The separation system of claim 19 or any one of the above claims, wherein the separation system is adapted for separating and/or analyzing ions.

22. A method for increasing the sensitivity of a contactless detection cell (15, 23), said detection cell comprising a transmitter electrode (16, 24) adapted for capacitively coupling an AC signal into a detection channel and a receiver electrode (17, 25) adapted for receiving an AC response signal in response to the AC signal that has been coupled into the detection channel, and with said detection cell being adapted for detecting an electrical property of one or more sample compounds, the method comprising a step of:

reducing, in at least a section of the detection channel, the inner cross-section of the detection channel relative to the inner cross-section of the flow path towards the detection channel.

23. The method of claim 22, wherein the electrical property is at least one of: conductivity, complex conductivity, impedance, resistance, reactance, relative permittivity.

24. The method of claim 22 or any one of the above claims, wherein the detection cell is adapted for detecting conductivity of the sample

compounds.

25. The method of claim 22 or any one of the above claims, wherein the one or more sample compounds have been separated in a preceding separation flow path (14, 22).

26. The method of claim 22 or any one of the above claims, wherein the transmitter electrode and the receiver electrode are axially separated from each other in the flow path.

27. The method of claim 22 or any one of the above claims, wherein the resistance of the sample volume between the transmitter electrode and the receiver electrode is increased by narrowing the inner diameter of the detection channel between the electrodes.

28. The method of claim 22 or any one of the above claims, wherein the detection channel's volume is reduced while keeping the distance between the electrodes sufficiently large for avoiding or at least reducing cross-coupling between the transmitter electrode and the receiver electrode.

29. The method of claim 22 or any one of the above claims, comprising a step of increasing the capacitive coupling between the electrodes and the detection channel by increasing the detection channel's inner diameter at the sites of the detection channel where the transmission electrode and the receiver electrode are respectively located.